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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,433	05/02/2005	Richard Michael Jenkins	124-1114	6067
23117	7590	06/30/2006	EXAMINER	
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			RAHLL, JERRY T	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/533,433	Applicant(s) JENKINS ET AL.	
	Examiner Jerry T. Rahl	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/2/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on May 2, 2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. However, please note that US Patent No. 5,248,698 to Jenkins et al. has not been considered. There is no information available for such a patent.

Drawings

2. The drawings submitted have been reviewed and determined to facilitate understanding of the invention. The drawings are accepted as submitted.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 11 is rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 7,042,631 to Smith et al.
5. Smith et al. describe a phase shifter including a hollow core optical waveguide and a means for varying the internal cross-sectional dimension of a portion of the hollow core waveguide (see Column 42 Lines 23-29).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,428,698 to Jenkins et al. in view of Smith et al.

9. Regarding Claim 1, Jenkins et al. describes a hollow core MMI device including a multimode waveguide (20) coupled to multiple fundamental mode waveguides (18, 22, 28) and a means (36) for shifting phase in the fundamental mode waveguides (see Figures 1-2 and 10 and Columns 4-6 and 14). Jenkins et al. does not describe a means for varying the cross-sectional dimensions of a portion of the fundamental waveguides. Smith et al. describes a phase-shifting a hollow waveguide by varying a cross-sectional dimension of the waveguide (see Column 42 Lines 23-29). At the time of invention, it would have been obvious to one of ordinary skill in the art to use the phase shifting means of Smith et al. with the MMI device of Jenkins et al. The

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motivation for doing so would have been reduce losses from optical signals entering the phase shifting means.

10. Regarding Claim 2, Jenkins et al. describe the waveguides having a square cross-section.

11. Regarding Claim 3, Jenkins et al. does not specifically describe the internal surfaces of the hollow core waveguides coated with a layer of reflective material. However, such coatings in hollow-core waveguides are well-known in the art. At the time of invention, it would have been obvious to one of ordinary skill in the art to use such a coating with the combined Jenkins et al. and Smith et al. device. The motivation for doing so would have been to reduce attenuation of the waveguides (see Jenkins et al. at Column 9 Lines 10-15).

12. Regarding Claim 4, Jenkins et al. describes the device formed in a semiconductor material (see Column 4).

13. Regarding Claim 5, Jenkins et al. does not specifically describe the device formed in silicon. However, the formation of MMI devices in silicon is well-known in the art. At the time of invention, it would have been obvious to form the combined Jenkins et al. and Smith et al. device of silicon. The motivation for doing so would have been to utilize common and efficient manufacturing methods. Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

14. Regarding Claim 6, Smith et al. does not specifically describe means for varying the cross-sectional dimension of the waveguide as a MEMS actuation means. Smith et al. describes the means as a piezo electric transducer (see Column 42 Lines 24-25). However, piezo electric

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transducers are commonly formed as MEMS actuators. At the time of invention, it would have been obvious to form cross-section varying means of Jenkins et al. and Smith et al. as a MEMS actuator. The motivation for doing so would have been to utilize common and efficient manufacturing methods.

15. Regarding Claim 7, Jenkins et al. describes the MMI device used in a routing device (See Column 8 Lines 6-10).

16. Regarding Claim 8, Smith et al. describes the means for varying the cross-section dimensions of the waveguide arranged such that the fundamental mode is varied by application of an external force (see Column 42 Lines 3-30).

17. Regarding Claim 9, Jenkins et al. describes an optical router including at least one fundamental mode input waveguide (18) coupled to an MMI beam splitter (20), the MMI beam splitter coupled via multiple relay waveguides (22) to an MMI beam combiner (24) having multiple fundamental mode output waveguides (28), where the relay waveguides include a means for altering the relative phases (36) between the beams propagating through the relay waveguides such that radiation from the fundamental input waveguide is selectively routed to any of the output waveguides (see Figures 1-2 and Columns 4-6). Jenkins et al. does not describe the means for altering the relative phases as a means for varying the cross-sectional dimensions of a portion of the fundamental waveguides. Smith et al. describes a phase-shifting a hollow waveguide by varying a cross-sectional dimension of the waveguide (see Column 42 Lines 23-29). At the time of invention, it would have been obvious to one of ordinary skill in the art to use the phase shifting means of Smith et al. with the MMI device of Jenkins et al. The

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motivation for doing so would have been reduce losses from optical signals entering the phase shifting means.

18. Regarding Claim 10, Jenkins et al. describes an optical router including a plurality of input/output fundamental mode waveguides (202) and a plurality of relay waveguides (206), where the router is configured to receive a beam from one of the input/output waveguides and divide the received beam into a plurality of beams, via modal dispersion in a multimode waveguide region (204), into a plurality of beams coupled to the relay waveguides, where the relay waveguides include a means for altering the relative phases (36) between the beams propagating through the relay waveguides and each relay waveguide is terminated with a reflective means (208) such that radiation is returned to the multimode waveguide region and routed to one of the input/output waveguides (see Figure 10 and Columns 14). Jenkins et al. does not describe the means for altering the relative phases as a means for varying the cross-sectional dimensions of a portion of the fundamental waveguides. Smith et al. describes a phase-shifting a hollow waveguide by varying a cross-sectional dimension of the waveguide (see Column 42 Lines 23-29). At the time of invention, it would have been obvious to one of ordinary skill in the art to use the phase shifting means of Smith et al. with the MMI device of Jenkins et al. The motivation for doing so would have been reduce losses from optical signals entering the phase shifting means.

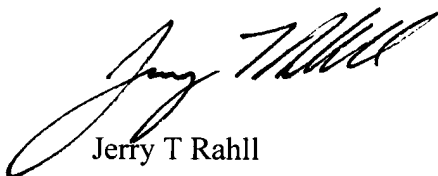
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry T. Rahll whose telephone number is (571) 272-2356. The examiner can normally be reached on M-Th (8:30-5:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Jerry T Rahl



MICHELLE CONNELLY-CUSHWA
PRIMARY EXAMINER